

Rec'd PCT/PTO 15 OCT 2004

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PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

17 AUG 2004

WIPO PCT

Applicant's or agent's file reference FCS-7371 PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/US 03/12955	International filing date (day/month/year) 24.04.2003	Priority date (day/month/year) 26.04.2002
International Patent Classification (IPC) or both national classification and IPC C08F2/50		
Applicant ALBEMARLE CORPORATION et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the opinion
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand  19.11.2003	Date of completion of this report  16.08.2004
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Boletti, C  Telephone No. +49 89 2399-8527  

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. **PCT/US 03/12955**

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*

**Description, Pages**

1-19 as originally filed

**Claims, Numbers**

1-26 as originally filed

27-44 filed with telefax on 21.07.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**INTERNATIONAL PRELIMINARY  
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International application No. **PCT/US 03/12955**

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**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes: Claims	1-44
	No: Claims	
Inventive step (IS)	Yes: Claims	
	No: Claims	1-44
Industrial applicability (IA)	Yes: Claims	1-44
	No: Claims	

**2. Citations and explanations**

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/US 03/12955

None of the prior art disclosures cited in the international search report describes a photopolymerisable composition comprising the long chain alkylamine of the present application. Therefore, the subject-matter of the claims is novel under art. 33(2) PCT.

With the aim of providing compositions that rapid cure, have low extractables and discolouration, citation DE 3331157 (D1) describes a photopolymerisable composition comprising at least one photopolymerisable monomer, at least one photopolymerisation initiator, and one or more tertiary amine (cf. claims and p. 5, l. 1-5). The alkyl substituents of the tertiary amine can be methyl, ethyl and long chain alkyl (cf. p. 6, l. 27-30 and p. 7, l. 3, 18-20). Even if not exemplified, the long chain alkyl amine of the present application is suggested by the contents in D1. Since the application does not show any unexpected effect vis-à-vis to D1, it is considered to represent a mere alternative to the teaching of that prior art disclosure.

Therefore, the application does not involve an inventive step under art. 33(3) PCT.

27. A composition as in Claim 23 wherein said compound consists of one or more tertiary amino groups, one or more ether oxygen atoms, and/or one or two hydroxyl groups linked to each other by  $C_{1-3}$  alkylene groups, such that there are at least two tertiary amino groups or at least one tertiary amino group and at least one ether oxygen atom or at least one hydroxyl group linked together in this fashion, and such that the compound has a total of at least 4 abstractable hydrogen atoms in positions alpha to at least some of the electronegative atoms in the compound, and wherein said one or more tertiary amino groups when not part of a cycloaliphatic ring system are di( $C_{1-3}$  alkyl)amino or mono( $C_{1-3}$  alkyl)amino group(s) depending on whether the tertiary amino group is a terminal group or an internal group.

28. A composition as in Claim 27 wherein said compound has at least 6 said abstractable hydrogen atoms.

29. A composition as in Claim 23 wherein said compound is selected from the group consisting of N,N,N'-trialkyl-1,2-ethanediamine, N,N,N',N'-tetraalkyl-1,2-ethanediamine, N,N,N'-trialkyl-1,3-propanediamine, N,N,N',N'-tetraalkyl-1,3-propanediamine, N-[2-(dialkylamino)ethyl]-N,N',N'-trialkyl-1,2-ethanediamine, N-[3-(dialkylamino)propyl]-N,N',N'-trialkyl-1,3-propanediamine, 1,4-dialkylpiperazine, 2,2'-oxybis[N,N-dialkylethanamine], 3,3'-oxybis[N,N-dialkylpropanamine], 4-[2-(dialkylamino)ethyl]morpholine, 4-[3-(dialkylamino)propyl]morpholine, triethylenediamine, 4,4'-(oxydi-2,1-ethanediyl)bismorpholine, N-hydroxyethylmorpholine, and N-hydroxypropylmorpholine, wherein the alkyl groups in the compounds having alkyl groups are, independently, methyl, ethyl, or propyl.

30. A composition as in Claim 23 wherein said compound is selected from the group consisting of N,N,N'-trimethyl-1,2-ethanediamine, N,N,N',N'-tetramethyl-1,2-ethanediamine, N,N,N'-trimethyl-1,3-propanediamine, N,N,N',N'-tetramethyl-1,3-propanediamine, N-[2-(dimethylamino)ethyl]-N,N',N'-trimethyl-1,2-ethanediamine, N-[3-(dimethylamino)propyl]-N,N',N'-trimethyl-1,3-propanediamine, 1,4-dimethylpiperazine, 2,2'-oxybis[N,N-dimethylethanamine], 3,3'-oxybis[N,N-dimethylpropanamine], 4-[2-(dimethylamino)ethyl]morpholine, 4-[3-(dimethylamino)propyl]morpholine, triethylenediamine, 4,4'-(oxydi-2,1-ethanediyl)bismorpholine, N-hydroxyethylmorpholine, and N-hydroxypropylmorpholine.

31. A composition as in Claim 23 wherein said compound is N-[3-(dimethylamino)propyl]-N,N',N'-trimethyl-1,3-propanediamine and said composition further comprises 2-hydroxy-2-methyl-1-phenylpropane-1-one.

32. A composition as in Claim 23 wherein said compound is 2,2'-oxybis[N,N-

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dimethylethanamine] and said composition further comprises 2-hydroxy-2-methyl-1-phenylpropane-1-one.

33. A composition as in Claim 23 wherein said compound is N,N-dimethyl-4-morpholineethanamine and said composition further comprises 2-hydroxy-2-methyl-1-phenylpropane-1-one.

34. A composition as in Claim 33 wherein said long chain amine is dodecyldimethylamine.

35. A method of (A) minimizing blushing, discoloration and premature degradation of a polymer formed by the photopolymerization of a photopolymerizable composition which comprises at least one photopolymerizable monomer, and at least one Type I photopolymerization initiator, or (B) eliminating or minimizing extractables, discoloration, and premature degradation of a film having a thickness of 2 mils or less where said film is formed by the photopolymerization of a photopolymerizable composition which comprises at least one photopolymerizable monomer, and at least one Type II photopolymerization initiator, said method characterized by including in the composition of (A) or of (B) before photopolymerization, at least one long chain alkylamine having (i) one or two methyl or ethyl groups and (ii) at least one alkyl group having a chain length of at least 8 carbon atoms.

36. A method as in Claim 35 wherein said method is the method of (A).

37. A method as in Claim 35 wherein said method is the method of (B).

38. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is octyldimethylamine.

39. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is decyldimethylamine.

40. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is dodecyldimethylamine.

41. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is tetradecyldimethylamine.

42. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is hexadecyldimethylamine.

43. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is octadecyldimethylamine.

44. A method as in any of Claims 35-37 wherein said at least one long chain alkylamine is didecylmethylamine.